

42. The method according to claim 41, wherein said surgical procedure is a PRK technique based on a photospallation mechanism.

87 43. The method according to claim 32, wherein said directing means includes three mirrors comprising an "L shaped" arrangement for reducing fluence rates, thereby reducing a probability of damage.

44. The method according to claim 32, wherein the nonlinear crystal is based on a doubly-resonant oscillator for reducing threshold.

Please add the following new Claims 60 which read as follows:

60. The method according to claim 32, wherein the pump beam is unfocused.

REMARKS

Reconsideration of the above identified application in view of the preceding amendments and following remarks is respectfully requested.

Claims 17-23, 26-29, 32-44 and 60 are pending in this application. By this Amendment, Applicants have canceled Claims 24 and 25 without prejudice and amended Claims 17-19, 21, 26-28, 33, 36, 39 and 41-44. New Claim 60 has been added by this amendment. It is respectfully submitted that no new matter has been introduced by these amendments, as support therefor is found throughout the specification and drawings.

Claims 18-22, 24-29, 33-37 and 39-44 were rejected under 35 U.S.C. §112, second paragraphs, for having certain informalities. The claims have been

amended to correct these informalities and therefore, withdrawal of the rejection is respectfully requested.

In the Office Action, Claims 17-29 and 32-34 were rejected under 35 U.S.C. §103(a) over Dingus et al. in view of U.S. Patent No. 5,520,679.

Dingus et al. describes ablation of biological tissue using photospallation. Dingus et al. provide a plurality of equations, however, Dingus et al. clearly state that such equations without more can not tell whether a particular tissue exposed to a laser run under such parameters will lead to a medically useful result. At best, Dingus et al. encourage experimentation with lasers in the medical arts. As the Examiner must know, such obvious-to-try suggestions fall woefully short of the necessary standard for an obviousness rejection. As a result, the rejection is fatally flawed and withdrawal thereof is respectfully requested.

Lin discloses an ophthalmic surgery method using a non-contact scanning laser. Lin does not teach photospallation.

It is respectfully submitted that one skilled in the art to which the subject invention appertains would not have been motivated to combine Dingus et al. with Lin as suggested by the Examiner. Applicant's assert that the Examiner is using improper hindsight reasoning to pick and choose among Dingus et al. and Lin to arrive at the present invention. Not only does such picking and choosing not constitute anticipation, it is inappropriate even in the determination of obviousness without direction from the prior art and motivation to do so. Neither reference provides such motivation, teaching or suggestion to combine these references in the manner suggested by the Examiner. Accordingly, applicant's representative asserts that all of the claims pending in this application are patentable over the combination and withdrawal of the rejection is respectfully requested.

Furthermore, even if the references were combined as suggested by the Examiner, the claimed invention would not be obtained. There is nothing in either of these references that discloses or suggests, either alone or in combination, in whole or in part, the device defined by the Claims of the subject application.

In particular, there is nothing in either Dingus et al. or Lin which discloses or suggests, alone or in part, in whole or in combination, a method for performing a laser surgical procedure on a tissue in a highly localized manner, the method including the steps of: generating a pump beam having a wavelength ranging approximately from 1.0 to 1.1 μ m, passing the pump beam through a nonlinear crystal to parametrically convert the pump beam into an idler beam and a signal beam wherein the idler beam has a wavelength in the mid-infrared range corresponding approximately to an absorption peak of the tissue, and directing the idler beam onto the tissue to remove portions of the tissue with a thermal damage zone of less than 2 μ m primarily by a photo-mechanical ablation process as recited by Claim 17. Therefore, Claim 17 and each of the claims depending therefrom are not rendered obvious by the combination of references cited by the Examiner and withdrawal of the rejection is respectfully requested.

Moreover, neither Dingus et al. or Lin teach, motivate or suggest the step of generating the pump beam which produces the pump beam with a pulse duration of approximately 25 to 50 ns, a repetition rate of approximately 10 to 50 Hz and a transverse mode structure consisting of single or multiple modes, and the idler beam has an energy output of approximately 5 to 30 mJ as recited by Claim 19. Yet still further, neither Dingus et al. or Lin teach, motivate or suggest directing means includes three mirrors comprising an "L shaped" arrangement for reducing fluence, thereby reducing a probability of damage as recited by Claim 28. Consequently, for these additional reasons

Claims 19 and 28 are not rendered obvious by the combination of references cited by the Examiner and withdrawal of the rejection is respectfully requested.

With respect to Claim 32, there is nothing in either Dingus et al. or Lin which discloses or suggests, alone or in part, in whole or in combination, a method for removing corneal tissue from an eye of a patient, the method including the steps of: generating a pump beam having a wavelength of approximately 1 μm ; passing the pump beam through a nonlinear crystal to parametrically convert the pump beam into an idler beam and a signal beam, the idler beam having a wavelength in the mid-infrared range corresponding to a corneal absorption peak; and scanning the beam across an area of the corneal tissue in a predefined pattern to remove portions of the corneal tissue primarily by a photo-mechanical ablation process as recited by Claim 32. Therefore, Claim 17 and each of the claims depending therefrom are not rendered obvious by the combination of references cited by the Examiner and withdrawal of the rejection is respectfully requested.

Moreover, neither Dingus et al. or Lin teach, motivate or suggest the step of generating the pump beam which produces the pump beam with a pulse duration of less than 50 ns, a repetition rate of at least 10 Hz and a transverse mode structure consisting of single or multiple modes as recited by Claim 34. Yet still further, neither Dingus et al. or Lin teach, motivate or suggest directing means including three mirrors comprising an "L shaped" arrangement for reducing fluence, thereby reducing a probability of damage as recited by Claim 43 or a non-linear crystal based on a doubly resonant oscillator for reducing threshold as recited by Claim 44. Consequently, for these additional reasons Claims 34, 43 and 44 are not rendered obvious by the combination of references cited by the Examiner and withdrawal of the rejection is respectfully requested.

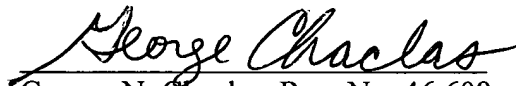
In the Office Action, Claims 17-29 and 32-44 were rejected under the judicially created doctrine of double patenting over claims 14-26 of U.S. Patent No. 5,782,822 to Telfair et al. Applicants respectfully submit that the claims under consideration are patentably distinct from Telfair et al. and, therefore, the double patenting rejection is improper. However, applicants respectfully request that the double patenting rejection be held in abeyance until patentable subject matter is indicated by the Examiner, at which time any appropriate terminal disclaimer will be executed.

In accordance with the 37 C.F.R. §1.121, the amended claims are appended hereto in a version which indicates the amendments. Any additional fees or overpayments due as a result of filing the present paper may be applied to Deposit Account No. 11-0231. It is respectfully submitted that all of the claims now remaining in this application, namely Claims 17-23, 26-29, 32-44 and 60 are in condition for allowance, and such action is earnestly solicited.

If after reviewing this amendment, the Examiner believes that a telephone interview would facilitate the resolution of any remaining matters the undersigned attorney may be contacted at the number set forth hereinbelow to schedule such an interview.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

17. A method for performing a laser surgical procedure on a tissue in a highly localized manner, said method comprising the steps of:

generating a pump beam having a wavelength ranging approximately from 1.0 to 1.1 μ m,

passing said pump beam through a nonlinear crystal to parametrically convert the pump beam into an idler beam and a signal beam, said idler beam having a wavelength in the mid-infrared range corresponding approximately to an absorption peak of said tissue; and

directing said idler beam onto said tissue to remove portions of said tissue with a thermal damage zone of less than 2 μ m primarily by a photo-mechanical ablation process.

18. The method according to claim 17, wherein the step of generating the pump beam is performed by [said laser source means is] a neodymium-doped laser.

19. The method according to claim 17, wherein the step of generating the pump beam produces said pump beam [has] with a pulse duration of [less than] approximately 25 to 50 ns, a repetition rate of [at least] approximately 10 to 50 Hz and a

transverse mode structure consisting of single or multiple modes, and the idler beam has an energy output of approximately 5 to 30 mJ.

21. The method according to claim 17, [wherein] further comprising the step of rotating the nonlinear crystal [is rotatable] about at least one of three principal axes.

26. The method according to claim 17, wherein said portions of said tissue are [surgical procedure is a] corneal tissue [ablation procedure].

27. The method according to claim 26, wherein said [corneal ablation] surgical procedure is a PRK technique based on a photospallation mechanism

28. The method according to claim 17, wherein said directing means includes three mirrors comprising an "L shaped" arrangement for reducing fluence, thereby reducing a probability of damage.

33. The method according to claim 32, wherein the step of generating the pump beam is performed by [said laser source means is] a neodymium-doped laser.

36. The method according to claim 32, further comprising the step of rotating [wherein] the nonlinear crystal [is rotatable] about at least one of three principal axes.

39. The method according to claim 32, wherein said idler beam has energy output of at least 1 mJ but not more than approximately 5 to 30 mJ.

41. The method according to claim 32, wherein said portions of said tissue are [surgical procedure is a] corneal tissue [ablation procedure].

42. The method according to claim 41, wherein said surgical [corneal ablation] procedure is a PRK technique based on a photospallation mechanism

43. The method according to claim 32, wherein said directing means includes three mirrors comprising an "L shaped" arrangement for reducing fluence rates, thereby reducing a probability of damage.

44. The method according to claim 32, wherein the nonlinear crystal is based on a doubly-resonant oscillator for reducing threshold.

60. The method according to claim 32, wherein the pump beam is unfocused.